

REMARKS

This is a full and timely response to the Office Action mailed August 16, 2005.

By this Amendment, claim 7 has been canceled without prejudice or disclaimer to its underlying subject matter. Further, claims 9-12 have been amended to depend solely on allowed claim 8. Lastly, claim 13 has been amended, and claim 14 have been added to rewrite the parts of claims 12 and 13 which were dependent on claim 7 in independent form to include all the limitations of the base claims. Thus, claims 8-14 are pending in this application.

In view of this Amendment, Applicant believes that all pending claims are in condition for allowance. Reexamination and reconsideration in light of the above amendments and the following remarks is respectfully requested.

Applicant wishes to thank the Examiner for the indication that claim 8 is allowable.

Objection to the Specification and Abstract

The specification (via a substitute specification) and abstract have been amended to change the term “*dimethyldichlorosilane polymer*” with the term “*polydimethylsiloxane*” as requested by the Examiner. No new matter has been added. Thus, in light of the changes to the specification and abstract, withdrawal of this objection is requested.

Rejection under 35 U.S.C. §102

Claims 7 and 9 are rejected under 35 U.S.C. §102(e) as allegedly being anticipated by Boler et al. (WO 2004/000547). Applicant respectfully traverses this rejection.

However, to expedite the allowance of the present application, Applicant has canceled claim 7, and amended claim 9 to depend on allowed claim 8, thereby rendering moot this rejection.

Rejection under 35 U.S.C. §103

Claims 10 and 11 are rejected under 35 U.S.C. §103(a) as allegedly being obvious over Boler et al. (WO 2004/000547) Applicant respectfully traverses this rejection.

However, to expedite the allowance of the present application, Applicant has amended claims 10 and 11 to depend on allowed claim 8, thereby rendering moot this rejection.

CONCLUSION

For the foregoing reasons, all the claims now pending in the present application have been indicated by the Examiner to be allowable. Accordingly, issuance of a Notice of Allowance is courteously solicited. If the Examiner has any comments or suggestions that could place this application in even better form, the Examiner is requested to telephone the undersigned attorney at the below-listed number.

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Respectfully submitted,

By 

Lee Cheng

Registration No.: 40,949

RADER, FISHMAN & GRAUER PLLC
1233 20th Street, N.W.
Suite 501
Washington, DC 20036
(202) 955-3750
Attorneys for Applicant

Should additional fees be necessary in connection with the filing of this paper, or if a petition for extension of time is required for timely acceptance of same, the Commissioner is hereby authorized to charge Deposit Account No. 180013 for any such fees; and applicant(s) hereby petition for any needed extension of time.



SPECIFICATION

Applicator for Strings

1. Technical field

The present invention relates to an applicator for strings

More particularly, the present invention relates to an applicator for strings stretched over a racket used in tennis, badminton etc.

2. Background art

As used, strings stretched over a racket are damaged on surface by frictions between strings or with balls.

As damaged on surface, longitudinal and transverse strings engage each other at intersections and make notches.

Notched strings are twisted and degraded in elasticity, bounce, etc., while causing more vibrations at the moment of hitting a ball.

Then, technique for improving strings in elasticity, bounce, etc., is desired.

For example, resin coating technique for improving ball control of a racket is known (see International Publication No. WO97/40228).

This technique makes strings adhere to each other so as to fix longitudinal and transverse strings at intersections, with the use of a coating agent of solution which consists of 1 to 50% recent resin or fossil resin in low boiling point organic solvent, to prevent strings from twisting for better ball control.

However, depending on their skills, some users feel uncomfortable when hitting a ball with such a racket that longitudinal and transverse strings are fixed at intersections.

Then, the object of the present invention is providing means for preventing strings from being damaged on surface, making them be hard to twist and improving them in elasticity, bounce, etc., without the uncomfortable touch at the moment of hitting a ball

3. Disclosure of the invention

The present inventor worked hard to solve the above problems and considered that it would be better to make strings be free to move as brand-new

condition, rather than to make them adhere to each other.

Then, the present inventor found out that ~~dimethyldichlorosilane polymer~~ (also known as “polydimethylsiloxane” which is the polymerized product of ~~dimethyldichlorosilane~~) is advantageously used for notched strings and achieved completion of the present invention. Hereinafter, all instances of the term “~~dimethyldichlorosilane polymer~~” is interchangeable with the term “polydimethylsiloxane”.

To sum up, the problems are solved in the present invention by means as follows.

- 1) Applicator for strings characterized in that ~~dimethyldichlorosilane polymer~~ polydimethylsiloxane is retained in a retainer.
- 2) Applicator for strings according to the above 1 characterized in that ~~dimethyldichlorosilane polymer~~ polydimethylsiloxane has a viscosity of 40 to 1000cs.
- 3) Applicator for strings according to the above 1 characterized in that ~~dimethyldichlorosilane polymer~~ polydimethylsiloxane has a viscosity of 100 to 1000cs.
- 4) Applicator for strings according to any one of the above 1 to 3 characterized in that ~~dimethyldichlorosilane polymer~~ polydimethylsiloxane contains scourer.
- 5) Applicator for strings according to any one of the above 1 to 4 characterized in that ~~dimethyldichlorosilane polymer~~ polydimethylsiloxane contains colorants.
- 6) Applicator for strings according to any one of the above 1 to 5 characterized in that the retainer has liquid absorbing and retaining properties.

4. Advantageous effects of the invention

With the use of an applicator of the present invention, strings are coated with ~~dimethyldichlorosilane polymer~~ polydimethylsiloxane not to disturb the moving of longitudinal and transverse strings at intersections. Then, when a ball touches the strings, intersections of longitudinal and transverse strings move in accordance with contact part with the ball, and strings are deeply dented and greatly deformed locally around the impact, thereby enabling a better ball holding.

As a result, strings become hard to be damaged and twisted, and get better elasticity, bounce, etc., also with less vibration at the moment of hitting a ball.

More specifically, since a ball holding becomes better and deformation of

strings is limited to a smaller area, the length of vibrating string becomes shorter, preventing big vibrations, and avoiding uncomfortable touch by hitting a ball, regardless of the user's skills.

In addition, a better ball holding enables better ball control even when user hits the ball at a point outside the sweet area, and hence, reducing missed shots.

Such effects are particularly advantageous for strings damaged as used.

In other words, notched strings (i.e., longitudinal and transverse strings engaging each other at intersections) degraded in elasticity, bounce, etc. can recover the original performance just as brand-new, thanks to application of ~~dimethyldichlorosilane~~ polymer polydimethylsiloxane by using an applicator for strings according to the present invention.

5. Best mode of realization of the invention

The present invention will be explained here below, referring to realization examples. However, the technical scope of the present invention is not restricted by the following realization or test examples.

Realization example 1 (different viscosities)

Applicators for strings in this realization example contain 9 different types of ~~dimethyldichlorosilane~~ polymers polydimethylsiloxanes having viscosities of 10, 20, 30, 50, 100, 200, 300, 500 and 1000cp, which are absorbed in sponge as a retainer.

Sponge used in this realization example has a cylindrical shape about 5cm in diameter and about 3.5cm in height. Additionally, the opposite face to the application face, i.e., a fixed face, is fixed to the main body of a container comprised of a lid about 1.2cm thick and a main body about 1.4cm deep.

The sponge contains about 0.7cc of ~~dimethyldichlorosilane~~ polymer polydimethylsiloxane uniformly by being sprayed from a nozzle in the form of mist.

The sponge is housed when it is not used, as pressed with the main body and the lid put together, into a cylindrical container 1.8cm thick.

To use it, hold the main body with hand and open the lid. Then, the sponge the fixed face thereof is fixed to the main body uprises to be ready for use.

Next, the steps for applying ~~dimethyldichlorosilane~~ polymer

polydimethylsiloxane on longitudinal and transverse strings stretched over a racket by the use of the above applicator will be explained.

Hold the main body of the above applicator with hand to bring the applying face of the sponge into contact with the strings stretched over the racket, and rub it against them to apply ~~dimethyldichlorosilane—polymer~~ polydimethylsiloxane on the both faces of strings.

Hereat, by rubbing the applying face of the sponge against strings and somewhat dislocating the longitudinal and transverse strings consciously, ~~dimethyldichlorosilane—polymer~~ polydimethylsiloxane is applied also at intersections of the longitudinal and transverse strings.

Finally, ~~dimethyldichlorosilane—polymer~~ polydimethylsiloxane is applied on surfaces of the longitudinal and transverse strings.

Strings, thus coated with ~~dimethyldichlorosilane—polymer~~ polydimethylsiloxane, are deeply dented and greatly deformed locally around the impact, without being disturbed in moving at intersections of the longitudinal and transverse strings.

Realization example 2 (containing scourer)

An applicator in this realization example contains about 0.7cc of mixture of ~~dimethyldichlorosilane—polymer~~ polydimethylsiloxane having a viscosity of 96 to 100 cp and 10% scourer by weight, which is absorbed in sponge as a retainer.

Sponge used in this realization example has a cylindrical shape about 5cm in diameter and about 3.5cm in height. Additionally, the opposite face to the application face, i.e., a fixed face, is fixed to the main body of a container comprised of a lid about 1.2cm thick and a main body about 1.4cm deep.

The sponge is housed when it is not used, as pressed with the main body and the lid put together, into a cylindrical container 1.8cm thick.

To use it, hold the main body with hand and open the lid. Then, the sponge the fixed face thereof is fixed to the main body uprises to be ready for use.

Next, the steps for applying ~~dimethyldichlorosilane—polymer~~ polydimethylsiloxane containing scourer on longitudinal and transverse strings stretched over a racket by the use of the above applicator will be explained.

Hold the main body of the above applicator with hand to bring the applying face of the sponge into contact with the strings stretched over the racket, and rub it against them to apply ~~dimethyldichlorosilane—polymer~~

polydimethylsiloxane containing scourer on the both faces of strings.

Hereat, by rubbing the applying face of the sponge against strings and somewhat dislocating the longitudinal and transverse strings consciously, ~~dimethyldichlorosilane—polymer~~ polydimethylsiloxane containing scourer is applied also at intersections of the longitudinal and transverse strings.

The surfaces of strings, chapped as used, are applied ~~dimethyldichlorosilane—polymer~~ polydimethylsiloxane containing scourer, being polished and recovering the smoothness as brand-new thanks to the scourer on the applying face.

Finally, ~~dimethyldichlorosilane—polymer~~ polydimethylsiloxane containing scourer is applied on surfaces of the longitudinal and transverse strings.

Then, longitudinal and transverse strings are coated with ~~dimethyldichlorosilane—polymer~~ polydimethylsiloxane containing scourer, almost recovering the smooth surface when brand-new.

Strings, thus coated with ~~dimethyldichlorosilane—polymer~~ polydimethylsiloxane containing scourer, are deeply dented and greatly deformed locally around the impact, without being disturbed in moving at intersections of the longitudinal and transverse strings.

Otherwise, ~~dimethyldichlorosilane—polymer~~ polydimethylsiloxane containing scourer may be applied on the strings by the use of the above applicator by the following steps.

Polish the string surfaces with an electric polisher before application.

Strings are polished its front face first and then back face with scourer on the polisher's cloth.

Hereat, if string faces are heated by friction with the polisher's cloth, stop polishing and wait until it is cooled down to the room temperature.

Then, start polishing again at the room temperature.

Thus, string surfaces are polished previously by being polished front face and back face about 8 times.

Dimethyldichlorosilane polymer containing scourer is more advantageously applied by the use of the above applicator on longitudinal and transverse strings stretched over a racket which are heated to 40 to 80°C after polishing.

Realization example 3 (containing scourer and colorant)

An applicator in this realization example contains about 0.7cc of mixture

of ~~dimethyldichlorosilane polymer~~ polydimethylsiloxane having a viscosity of 96 to 100 cp, 10% scourer by weight, and colorant, which is absorbed in sponge as a retainer as in realization example 2.

Dimethyldichlorosilane polymer with scourer and colorant is applied on strings stretched over a racket by the use of the above applicator according to the same steps as in realization example 2.

Incidentally, conditions of ~~dimethyldichlorosilane polymer~~ polydimethylsiloxane applied on strings can be checked directly with eyes, since strings are colored with colorant mixed with the polymer, thus enabling assessment of sustainability of the effects.

Test examples

15 rackets with brand-new strings stretched over were used in the same conditions until strings become twisted.

Then, as comparative examples, instead of ~~dimethyldichlorosilane polymer~~ polydimethylsiloxane, fluorine oil, engine oil, tempura oil or grease, which have viscosity of 100cp were applied on the strings of the rackets respectively, after absorbed into sponge as in realization example 1.

On the other hand, as inventive example 1, the applicators for strings of realization example 1 were used for application on strings of the rackets, respectively.

Then, as inventive example 2, the applicator for strings of realization example 2 was used for application on strings of rackets.

Then, as inventive example 3, the applicator for strings of realization example 3 was used for application on strings of rackets.

The respective rackets of the comparative examples and inventive examples were checked about deflection with load and tested by hitting balls actually in the same conditions.

The hitting performance was judged by how many times hitting should be repeated until the effect becomes lost (i.e., returning to the condition before application), and marked with × if the effect is lost with about 10 shots, ○ if the effect is kept despite with about 100 hits and ◎ if the effect is kept even with 300 hits or more.

The results were as follows.

About deflection with load, all of the inventive examples 1 to 3 have deflection of 0.6 to 0.7mm, while none of the comparative examples have

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deflection.

Then, regarding the hitting performance, in inventive example 1, viscosity of 10 to 30 cp is marked with ×, viscosity of 50cp is marked with ○ and viscosity of 100 to 1000cp is marked with ◎.

However, as for viscosity of 200 to 1000cp, it required a wipe after application.

Moreover, inventive examples 2 and 3 were both marked with ◎ about the hitting performance.

Here it is confirmed that, by the use of the applicator for strings containing colorant of inventive example 3, conditions of ~~dimethyldichlorosilane~~ polydimethylsiloxane containing scourer and colorant applied on strings can be checked directly with eyes, since strings are colored with colorant mixed with the polymer and scourer, thus enabling assessment of sustainability of the effects.